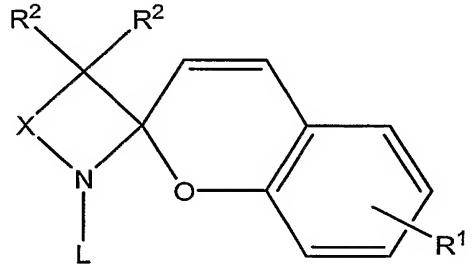
VIII. CLAIMS

What is claimed is:

1. A composition produced by the process comprising polymerizing a hydrogel precursor with a spiropyran.
2. The composition of claim 1, wherein the hydrogel precursor comprises a compound having at least one alkenyl group.
3. The composition of claim 1, wherein the hydrogel precursor comprises acrylonitrile, acrylic acid, acrylamide, or methacrylic acid.
4. The composition of claim 1, wherein the hydrogel precursor comprises a substituted acrylamide.
5. The composition of claim 1, wherein the hydrogel precursor comprises an N-alkyl substituted acrylamide.
6. The composition of claim 1, wherein the hydrogel precursor comprises N-methylacrylamide, N-ethylacrylamide, N-propyllacrylamide, or N-isopropylacrylamide.
7. The composition of claim 1, wherein the spiropyran comprises at least one alkenyl group.
8. The composition of claim 1, wherein the spiropyran comprises the Formula I.



(I)

wherein,

X is a substituted or unsubstituted, C1 to C4, alkyl or alkenyl group;

R^1 is H, alkyl, alkenyl, alkoxy, aryl, halide, hydroxyl, amino, nitro, silyl, sulfo-oxo, sulfonylamino, ether, ester, carboxylic acid, or thiol group;

each R^2 is, independently of each other, H, alkyl, alkenyl, alkoxy, aryl, halide, hydroxyl, amino, nitro, silyl, sulfo-oxo, sulfonylamino, thiol, ether, ester, carboxylic acid, or together each R^2 substituent forms a keto group, a cyclicalkyl group, a cyclicalkenyl group, or an aryl group; and

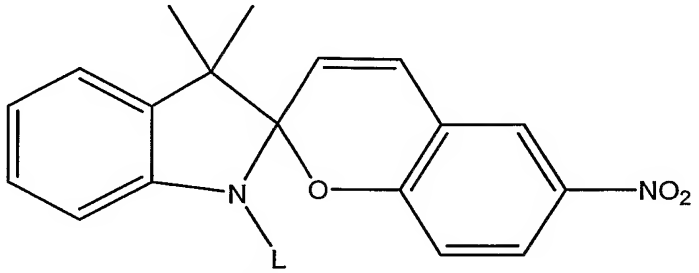
L comprises an alkenyl group.

9. The composition of claim 7, wherein X is a fused aryl group.

10. The composition of claim 9, wherein each R^2 is an alkyl group.

11. The composition of claim 10, wherein R^1 is NO_2.

12. The composition of claim 1, wherein the spiropyran has the Formula II.



(II)

wherein L is $-(CH_2)_mC(O)NH(CH_2)_nCH=CH_2$, wherein m is from 1 to 12 and n is from 0 to 12.

13. The composition of claim 12, wherein m is 3 and n is 1.

14. The composition of claim 1, wherein the process further comprises the addition of a crosslinking agent.

15. The hydrogel of claim 14, wherein the crosslinking agent comprises a compound comprising at least two alkenyl groups.

16. The composition of claim 14, wherein the crosslinking agent comprises N,N'-methylene-bis-acrylamide.

17. A composition produced by the process comprising reacting a hydrogel precursor comprising at least one hydroxyl group and/or carboxylic acid group with a spiropyran comprising a group capable of reacting with the hydroxyl group or carboxylic acid group.

18. The composition of claim 17, wherein the hydrogel precursor comprises hydroxypropylcellulose or hyaluronic acid.

19. The composition of claim 17, wherein the hydrogel precursor is polymerized in the absence of a surfactant.

20. A composition comprising admixing a hydrogel precursor and a spiropyran.

21. A composition comprising a hydrogel and a spiropyran, wherein the spiropyran is bonded to the hydrogel.

22. The composition in any of claims 1-21, wherein the hydrogel is present in an amount of from about 99 to about 80 weight percent and the spiropyran is present in an amount of from about 1 to about 20 weight percent.

23. The composition in any of claims 1-22, wherein the composition comprises a microgel.

24. The composition in any of claims 1-22, wherein the composition comprises a nanogel.

25. The composition in any of claims 1-22, wherein the composition comprises a colloidosome.

26. The composition in any of claims 1-25, wherein the composition decreases in size upon exposure to UV light.

27. The composition in any of claims 1-25, wherein the composition increases in size upon exposure to visible light.

28. A pharmaceutical formulation composition comprising the composition in any of claims 1-27 and a pharmaceutical carrier.

29. The pharmaceutical formulation of claim 27, further comprising a pharmaceutical active.

30. The pharmaceutical formulation of claim 28, wherein the pharmaceutical active comprises a cell.

31. The pharmaceutical formulation of claim 28, wherein the pharmaceutical active comprises a nucleic acid.

32. The pharmaceutical formulation of claim 28, wherein the pharmaceutical active is an antisence oligonucleotide.

33. A method of delivering a pharmaceutical active to a subject, comprising administering the composition in any of claims 1-27 and a pharmaceutical active.

34. The method of claim 33, wherein the pharmaceutical active comprises a nucleic acid.

35. A method of decreasing an inflammatory response in a subject comprising administering the composition in any of claims 1-27 and an antisense oligonucleotide of ICAM-1.